DOCUMENT RESUME

ED 122 622 FL 007 627

AUTHOR	Kettemann, Bernhard
TITLE	Perceptual Phonetic Correction in Foreign Language Teaching. Lektos: Interdisciplinary Working Papers in Language Sciences, Vol. 1, No. 2.
INSTITUTION	Louisville Univ., Ky. Interdisciplinary Program in Linguistics.
PUB DATE	Oct 75
NOTE	32p.
AVAILABLE FROM	University of Louisville, Interdisciplinary Program in Linguistics, Room 214 Humanities, Louisville, Kentucky 40208
EDRS PRICE	MF-$0.83 HC-$2.06 Plus Postage
DESCRIPTORS	Applied Linguistics; *Auditory Perception; *Instructional Aids; *Language Instruction; Language Research; Learning Processes; Oral Communication; *Phonetics; Pronunciation Instruction; *Second Language Learning; Teaching Methods
IDENTIFIERS	*Phonetic Correction; Sound Frequency Manipulation; SUVAG Lingua; Verbo Tonal Method

ABSTRACT

This paper describes a method of corrective phonetics based on perceptual phonetics, because it is in this area that contact with a foreign language is first established. Methods of correcting phonetic perception by frequency manipulation (using the frequency selector "SUVAG-Lingua") within the framework of the verbo-tonal method of foreign language teaching are discussed, and it is argued that further investigation will be necessary before conclusive judgements as to the didactic and linguistic value of the frequency selector can be made. This paper is a short introduction to the stage of development of this technical aid in language teaching and aims also to stimulate further investigation, because no relevant research or experimentation has been carried out in the United States, although frequency selectors have been in use in several European countries for a considerable amount of time. (Author)

****
* Documents acquired by ERIC include many informal unpublished *
* materials not available from other sources. ERIC makes every effort *
* to obtain the best copy available. Nevertheless, items of marginal *
* reproducibility are often encountered and this affects the quality *
* of the microfiche and hardcopy reproductions ERIC makes available *
* via the ERIC Document Reproduction Service (EDRS). EDRS is not *
* responsible for the quality of the original document. Reproductions *
* supplied by EDRS are the best that can be made from the original. *
****

ED122622

PERCEPTUAL PHONETIC CORRECTION IN FOREIGN LANGUAGE TEACHING

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

Bernhard Kettemann

Universität Graz

Summary:

The method of phonetic correction described in this article[1] incorporates linguistic, psycholinguistic[2] and biophysiological aspects of foreign language learning.

Contrastive linguistics are of interest for language teaching insofar as they compare grammatical subsystems of different languages. On the basis of interlingual contrasts of subsystems in similar contexts, differences can be noted and ordered, and thus potential errors caused by the interference of previously acquired languages can be predicted. The prediction of such errors makes it possible to improve methodologically and didactically the corrective measures used and the psychological explanations of error systems in the learner's language. This helps in constructing preventive drills, and in general will lead to more effective methods of correction.[3]

The methods of corrective phonetics should be based on perceptual phonetics as it is in this area that first contact with a (foreign) language is established. Methods

FL007627

of correcting phonetic perception by frequency manipulation within the framework of the verbo-tonal method of foreign language teaching are discussed, and it is argued that further investigation will be necessary before conclusive judgements as to the didactic and linguistic value of this method can be made.

1. A system of interference caused errors

Starting with the perceptual sensibilization for foreign sounds, those articulatory errors of foreign language learners that would negatively influence a proper process of communication in the foreign language should either be stopped from appearing in the first place, or if already extant, should be corrected by improving the abilities of interlingual perceptual differentiation and intralingual discrimination.[4]

In order to prevent most of the errors caused by interference, prophylactic phonetic correction procedures are based on a contrastive analysis of first and target languages, yielding systems of errors on the functional phonetic level.

The goal of this concept of phonetic correction is to enable the learner to become aware of his errors, and thus to correct them.

In the following table, the standard[5] vowel systems of English, German, and French are used to exemplify the application of contrastive analysis to interference based error prediction. The vowels have been subjectively ordered according

to two intuitive perceptual multivalued features [ɑ dark] and [ɑ light]. The values for [ɑ dark] are: -2, -1, Ø, +1, +2, +3, and for [ɑ light]: -1, Ø, +1. In this tentatively established perceptual scale, the features are valued according to the direction, and the degree, of deviation from a neutral perceptual impression defined as being produced by [ə]. This table could be reinterpretated as an articulatory scale by using the feature [ɑ dark] as the horizontal and the feature [ɑ light] as the vertical axis. I could also be reinterpretated as an acoustic[6] scale by representing:

$\begin{bmatrix}+\text{light}\\-\text{dark}\end{bmatrix}$ as $\begin{bmatrix}\text{acute}\\\text{diffuse}\end{bmatrix}$ and $\begin{bmatrix}-\text{light}\\+\text{dark}\end{bmatrix}$ as $\begin{bmatrix}\text{grave}\\\text{compact}\end{bmatrix}$ and

$\begin{bmatrix}+\text{dark}\\+\text{light}\end{bmatrix}$ as $\begin{bmatrix}\text{acute}\\\text{compact}\end{bmatrix}$ and $\begin{bmatrix}-\text{dark}\\-\text{light}\end{bmatrix}$ as $\begin{bmatrix}\text{grave}\\\text{diffuse}\end{bmatrix}$.[7]

The gaps in the vowel systems (dashes in the table) symbolize potential problems of interference for a learner whose first language lacks an equivalent gap, or vice versa.

See Table I (following page)

Table I

A transfer comparison of the vowel systems of English, German, and French

dark	light	English	German	French
-2	+1	i	i	-
-1	+1	I	I	I
ø	+1	-	ü	ü
+1	+1	-	u	-
+2	+1	ʊ	ʊ	ʊ
+3	+1	u	u	-
-2	ø	-	e	e
-1	ø	ɛ	ɛ	ɛ
ø	ø	ə	ə	ə
+1	ø	-	ö	o
+2	ø	ɔ	ɔ	ɔ
+3	ø	-	o	o
-2	-1	-	æ	-
-1	-1	æ	-	-
+2	-1	ɑ	ɑ	ɑ
+3	-1	-	a	a
+2/-2	-1/+1	ɑi	ɑi	-
+2/ 3	-1/+1	ɑu	ɑu	-
+3/-2	ø/+1	oi	oi	-
-2	ø/+1	ei	-	-
+3	ø/+1	ou	-	-
nas/-2	ø	-	-	ɛ̃
nas/+3	ø	-	-	ɔ̃
nas/+2	-1	-	-	ɑ̃

These interference problems are caused by the different phonetic functions of similar[8] sounds in first and target languages. The phonetic function of English /ei, ɛ, æ/ in the English vowel system produces different areas of allophonic tolerance[9] compared to those of the perceptually similar sounds of French and German, where the phonetic function and allophonic tolerance for the perceptual identification of phonemes is systematized in a different way, as shown in the following table:

Table II

Allophonic tolerance

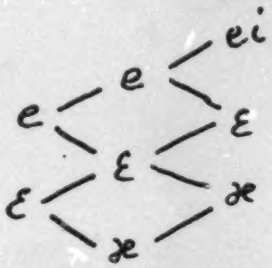
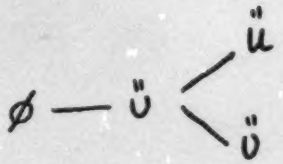
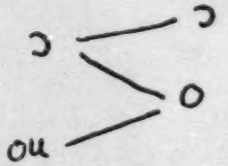
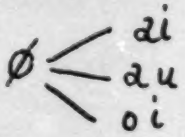
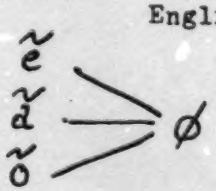
English	i	ɪ	ei	ɛ	æ
German	i	ɪ	e	ɛ	æ
French	ɪ		e	ɛ	

This allophonic overlapping creates errors based on phonological processes e.g. dissimilation and neutralization, by classifying L_2 allophones according to L_1 allophonic tolerance. This dilemma of perceptual choice and functional ordering is shown for the vowel systems of English, German, and French in the following table:

See Table III (following page)

Table III

Perceptual choice and functional ordering

<table>
<tr>
<td>French German English
  </td>
<td>English French German
  </td>
</tr>
<tr>
<td>French German English
 </td>
<td>English German French
  </td>
</tr>
<tr>
<td>English German French
 </td>
<td>French German English
  </td>
</tr>
<tr>
<td>French German English
 </td>
<td>French German English
  </td>
</tr>
</table>

2. Methods of phonetic correction

The oldest method of phonetic correction in language teaching is based on articulatory phonetics. The student is shown the articulatory movements, the point and manner of articulation. The weakness of this articulatory method is its analytical point of view. The therapy is limited to single sounds. Intonation, rhythm, suprasegmentals are disregarded. Success is, therefore, limited as the learner falls back into the same errors because he is not aware of the total articulatory and perceptual context.[10]

On the other hand, it has also been established that the results and methods of acoustic phonetics, as e.g. the physical analysis of sounds, the formant frequencies and other possible parameters, can only have little bearing on the perception and production of specific phones. It should be noted, however, that further steps of abstraction can make acoustic phonetics indirectly useful, from the didactic point of view. This process of adapting experimental phonetic findings to the needs of foreign language teaching is still in the embryonic stage.

This leaves us with perceptual phonetics. It is here that corrective phonetics should begin. We can only imitate correctly if we have perceived the stimulus correctly. Each language has a specific optimal set of frequencies for its sounds. The learner is used to the set of frequencies in his

first language. Exposed to a language with a differently structured set of optimal frequencies, he will perceive only those frequencies or sets of frequencies to which he is accustomed and will neglect the others. This means that he will perceive the sound differently from the way it was produced.

3. Phonetic correction by frequency manipulation

In order to prevent articulatory errors, perceptual distortion caused by interference must be prevented. This can be done by eliminating the optimal set or sets of frequencies for the sound or sounds of the first language, and by letting the learner hear only the optimal set or sets of frequencies of the target language. This means the perceptual impression is distorted[11] correctively in the opposite direction from the learner's distortion tendency.

Technically, this problem is solved by sending the sound to be learned through different frequency filters. The frequency filter (frequency selector) SUVAG-Lingua (Système-universel-verbo-auditif-Guberina) normally has between twelve and sixteen filters, sometimes up to twenty. Each of these filters allows the frequencies of one octave to pass while blocking all the others. By increasing or decreasing the number of filters, the optimal set of frequencies for the target language can be strengthened, that of the first language weakened. The learner will then hear a sound that

does not remind him of a similar sound in his first language. He cannot, therefore, use the perceptually closest allophone in his first language to produce the new sound. It is not sufficient, however, to work with the optimal frequency alone. Often the corrective frequency of individual learner has to be determined, i.e. the set of frequencies that best counteracts the individual distortion tendency.[12]

Besides the frequency selector for individual correction, there is a simpler machine for group conditioning. This filter has only four channels. The most important is the one that allows the frequencies between 400 and 700 Hz and between 3,500 and 5,000 Hz to pass, thereby eliminating the frequencies of normal conversation so that only a discontinuous spectrum is perceived and first language interference eliminated.

4. Basic assumptions of phonetic correction within the framework of the verbo-tonal method

The principles on which phonetic correction within the framework of the verbo-tonal method[13] is based are as follows:

1). the existance of an optimal frequency for each sound,
2). the discontinuity of perceptual sound structure,[14]
3). the importance of intonation, rhythm, tension, and phonetic environment as aids to phonetic correction.

In foreign language teaching, phonetic correction within the framework of the verbo-tonal method claims to be

able to correct interference caused errors in phonetic production by frequency manipulation, i.e. the altering of perceptual parameters, e.g. by changing the degree of tenseness, by intensifying certain intonation patterns, by changing phonetic environments, or by altering the frequency structure of certain sounds. I will now briefly discuss these principles.

5. Optimal frequencies

The optimal frequencies on which this phonetic correction is based have been established for some time for English, German, and French.[15] The optimal frequency is a perceptual phonetic concept. It denotes the set of frequencies of the octave at which the sound/word/sentence is perceived as the best approximation to the unfiltered original. For example, if the realization of the vowel /i/ is passed consecutively through the different filters from low to high frequencies, then realizations of /u, o, a, e,/ are perceived at first, and it is only at a frequency of 3,200 to 6,400 Hz that /i/ is heard.[16] This perception of /i/ is very similar to the unfiltered original in all three languages. Therefore, the optimal frequency for /i/ in English, German, and French has been established as being 3,200 to 6,400 Hz. In this way, the optimal frequencies, as shown in the following tables IV, V, VI, VII, have been identified.

See Tables IV, V, VI, VII (following pages)

Table IV

Optimal frequencies of vowels and diphthongs

octave frequency in Hz	is optimal for		
	English	German	French
3.200 - 6.400	i	i	i
2.400 - 4.800	ei ai	e	e
1.600 - 3.200	ɛ I	ɛ ɛ: I	ɛ
1.200 - 2.400	æ	a ɑ ə	a
800 - 1.600	a ə ɑ	æ	œ
600 - 1.200	ɑ ɔ o	ɔ	ɑ
400 - 800	əu γ + 1.200 - 2.400 Hz	ɑo œ	ə ɔ ø
300 - 600	ou i	o œ	o
200 - 400	u	ø ʊ γ	y
150 - 300		y u	u

Table V

Optimal frequencies for Plosives

octave frequency in Hz	is optimal for		
	English	German	French
1.600 - 3.200			t
1.200 - 2.400		t	d k
800 - 1.600	d t	d k	g
600 - 1.200	g k		
400 - 800		g	
300 - 600		b	b p
200 - 400	b p	p	

Table VI

Optimal frequencies for fricatives, affricates, and liquids

octave frequency in Hz	is optimal for		
	English	German	French
6.400 -12.800	s		S
4.800 - 9.600	z	s z ts	z
2.400 - 4.800	θ	ʃ ʂ	
1.600 - 3.200	ʃ tʃ	ʃ tʃ	ʃ
1.200 - 2.400	ʒ dʒ ɜ	f h pf	ʃ
800 - 1.600	h l	v ː l r	l
600 - 1.200	v f		v f
400 - 800	r		
300 - 600			r

Table VII

Optimal frequencies of nasals

The coarticulatory process of oral closure and velar opening is represented acoustically by two sets of frequencies, that are necessary to define the optimal frequency of nasals

octaves sets of frequencies in Hz	are optimal for		
	English	German	French
2.400 - 4.800 + 300-600	ŋ	ŋ	
1.600 - 3.200 + 600-1200			ɱ
1.600 - 3.200 + 150-300	ɳ	ɳ	
1.200 - 2.400 + 400-800	ɱ		ɱ
1.200 - 2.400 + 150-300		ɱ	

Besides these differences for individual sounds, some authors believe[17] that different languages (taken as a whole) use different ranges of frequencies. At this point, I am not sure whether this statement is simply trivial or not; it depends on whether this statement is derived from the establishment of individual optimals (i.e. for each sound) or whether there are further implications resulting from this view, e.g. inherent new descriptive qualities.

6. Discontinuity of perception

When a text A is transmitted on frequencies of 40 to 1,024 Hz, 65% of the text is understood. Transmitting the same text A on frequencies of 8,192 to 10,240 Hz results in 0% understanding. Yet the combination of the two ranges of frequencies (a discontinued spectrum of the frequencies below 1,024 Hz and above 8,192 Hz) results in 90% understanding. Transmitting text B on frequencies of 2,500 to 12,800 Hz results in 70% understanding; transmitting the same text on frequencies between 40 and 600 Hz results in 50% understanding. A combination of the two ranges of frequencies (under 600 and over 2,500 Hz) leads to 100% understanding.[18]

By transmitting in a discontinued spectrum it is possible to exclude the range of conversational frequencies for all languages (1,000 to 3,000 Hz) which could cause interference from the first language, and at the same time still produce a full perceptual impression. Another

advantage of discontinued spectral transmission is that the low frequencies carrying the intonation and rhythm of the (foreign) language can be isolated, stressed, and better internalized than by presenting the conversational frequencies at the same time. These low frequencies are received by the whole body of the listener.[19]

It has been established in several tests with students at different levels of foreign language learning that those students who were given exercises excluding conversational frequencies, acquired L_2 pronunciation faster, and retained it better than students in classes taught conventionally. These experiments, however, seem to have been carried out more impressionistically than scientifically. Too many variables have not been controlled, the classes chosen have not been representative, the statistical evaluations often lead to insignificant results, the samples are too small, many of the experimental steps cannot be reproduced, and some conclusions seem to be purely arbitrary.[20] As yet there has been no study concerned with the long term effects of this method of corrective phonetics. There are no indications as to the relation between the time devoted to conventional classroom correction and the time spent using the frequency selector in non-experimental situations. Accordingly, the results have to be viewed with some scepticism.

7. The importance of supersegmentals

Accent, rhythm and pitch can be isolated perceptually at the suprasegmental phonetic level. Intonation can be interpretated as systematically relevant changes of pitch in terms of intensity, quantity, and quality.[21] These suprasegmental variations influence the perception of specific segments in various ways. Rising intonation contours support the perception of higher frequencies, falling intonation contours strengthen the perceptual impression of low frequencies in the different sets of frequencies of specific segments. To help correct a vowel that is pronounced too "light", it can be placed at the low points of an intonation contour. This way it will be pronounced "darker".

On the other hand, accent, and rhythm play an equally important part. Keeping the same example, we can even strenghten the above-mentioned effect by placing the sound to be corrected on maxima (lighter) or minima (darker) of intensity, or by speeding up the tempo of speech (darker through vowel reduction) or by slowing it down (lighter through greater degree of distinctiveness and intensity of higher frequencies).

In the more complex field of tension,[22] phonetic description has not yet come to any clear results. It is unclear, for example, how the physical, psychological, acoustic, and physiological constituents of segmental and

suprasegmental tension are related to each other. Nevertheless, perceptual phonetics has always worked with different degrees of tension. The degree of tension of segments and sequences depends on the shape of the intonation contour, the segmental position in the syllable, the intensity of articulation and the manner of articulation, as well as the segmental tension of neighboring sounds. Table VIII gives some examples of relative tension for different parameters:

Table VIII

Relative Tension

Parameter	Tense ⟶ Lax		
1. Intonation	rising intonation		falling intonation
2. Syllable position	initial	nucleus	final
3. Segmental articulatory intensity	/p, t, k/	/b, d, g/	/m, n, ŋ/
4. Manner of articulation	stops /p/	affricates /pf/	fricatives /f/
5. Segmental degree of tenseness	/p/t/k/ts/tʃ/dz/dž/s/z/m/ŋ/n/l/r/i/u/e/o/a/...		
6. Segmental degree of tenseness (vowels)	/i, e, o/		/I, E, O/

Suppose an English-speaking learner pronounces [p] in French [pɛʁ] aspirated and tense as [pʰ] then the parameter "segmental articulatory intensity" could be used by replacing [p] by [b] in order to counteract the learner's tendency to more tenseness by less tenseness to start with. Schematically, the process looks like this:

$$\begin{bmatrix} -2\text{voiced} \\ +3\text{tense} \\ +1\text{aspirated} \\ +1\text{released} \end{bmatrix} + \begin{bmatrix} +1\text{voiced} \\ -4\text{tense} \\ -2\text{aspirated} \\ -2\text{released} \end{bmatrix} = \begin{bmatrix} -1\text{voiced} \\ -1\text{tense} \\ -1\text{aspirated} \\ -1\text{released} \end{bmatrix}$$

(The multi-valued features[23] represent:

[+/−] presence or absence of a feature,

[1,2,3]: the higher the numeral the higher the degree of presence or absence of a feature.)

The optimal sentence for a corrective drill in our example would have falling intonation on a word like French "tape". [p] would then fulfill the conditions of 1,2,5 of Table VIII which all stress its low degree of tension in comparison to English [p]. With this example, the influence of lax [a] before [p] is used to optimize the impression of laxness of French [p].

The results of combinatory phonetics and the insights into co-articulatory processes are used in constructing teaching material. Vowels influence consonants through palatalization (lighter) or labialization and velarization (darker); preceding labial, velar, and nasal consonants "darken" (dampen) the higher frequencies of a vowel, while

preceeding alveolar or palatal consonants have the opposite effect. These combinations are used a perceptual aids in constructing programmed corrective courses.[24]

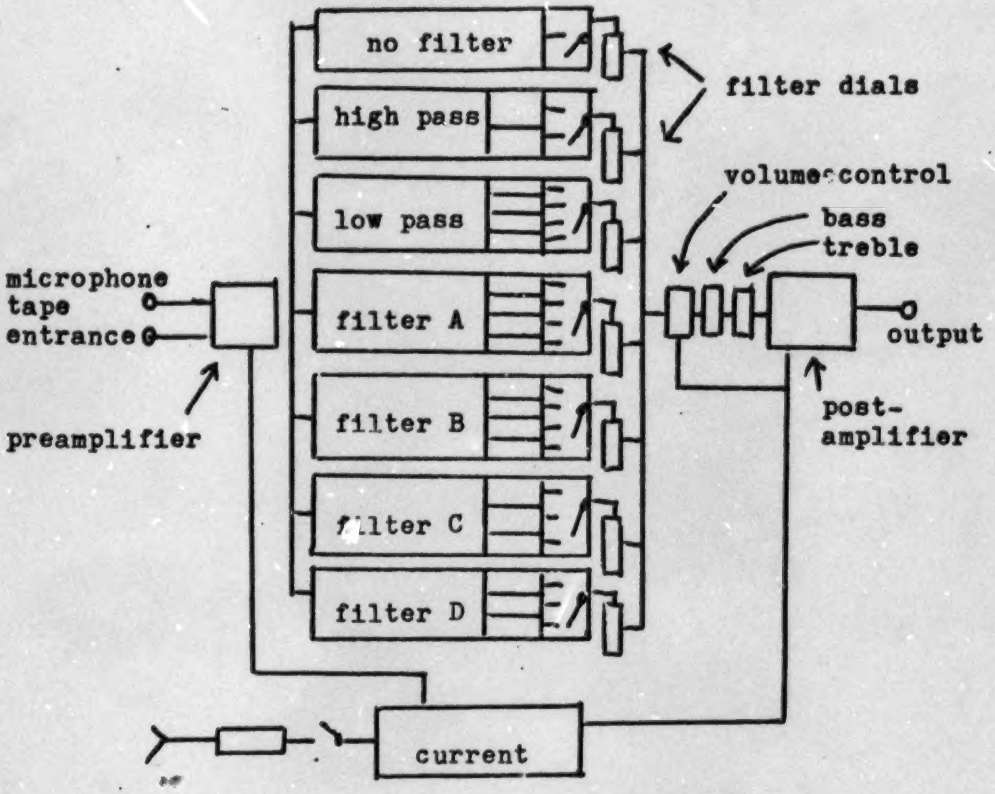
8. SUVAG-Lingua

Phonetic correction within the theory of the verbo-tonal method is based on Guberina's work on speech therapy with the deaf and hard-of-hearing at the University of Zagreb. Guberina developed two frequency selectors, called SUVAG I and II, in the early 1950's. The work with these machines showed good results in the speech rehabilitation of patients with damaged perceptual mechanisms. In connection with different types of tactile vibrators, these machines were used for about ten years until in the early 1960's points of common interest were discovered between the rehabilitation of the hard-of-hearing and foreign language teaching. First the SUVAG-Lingua for intensive individual correction was developed. It took another ten years till Cureau (1972) and Arambasin (1973) built a simpler version for preventive collective conditioning. The following figures show the difference between the two types of SUVAG-Linguas.

See Figures I and II (following pages)

Figure I

Circuit diagram of a SUVAG-Lingua for individual correction

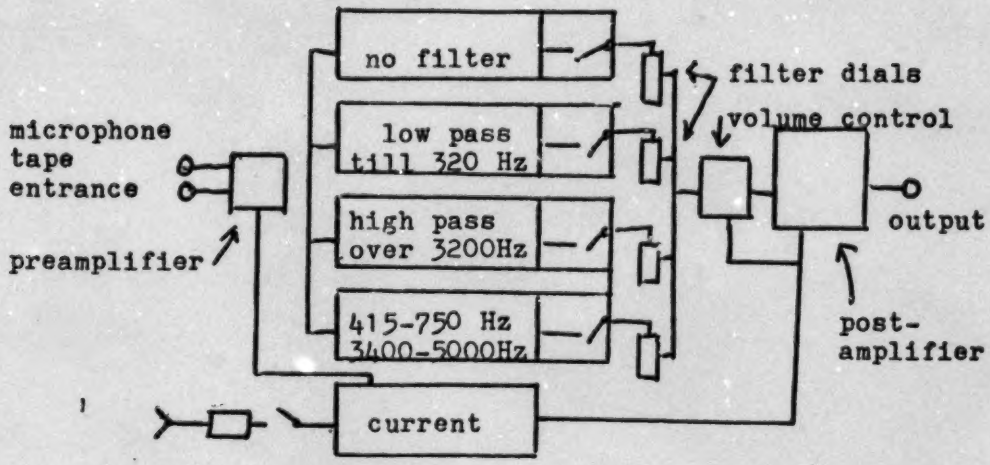


high pass:	2,4	kHz	B:	100 -	200	Hz
	6,2	"		200 -	400	"
				400 -	800	"
low pass:	0,1	kHz		800 -	1600	"
	0,14	"				
	0,21	"	C:	1200 -	2400	Hz
	0,28	"		2400 -	4800	"
				4800 -	9600	"
A: 75 -	150	Hz				
150 -	300	"	D:	1600 -	3200	Hz
300 -	600	"		3200 -	6400	"
600 -	1200	"		6400 -	128000	"

The Hz-numbers for the filters mean that the filter in question lets through only the frequencies or sets of frequencies listed above and blocks all others.

Figure II

Circuit diagram of a SUVAG-Lingua for group correction



The Hz-numbers for the filters mean that the filter in question lets through only the frequencies or sets of frequencies listed above and blocks all others.

9. Individual Correction Procedure

The skeleton of an individual correction program would be as follows:

1). Recording of a short sentence on tape (or loop) e.g. to correct a German learning English with a tendency to replace English "th" by "s"

a). [s → θ]: They both went south!

b). [z → ð]: Is that your brother?[25]

2). Unfiltered presentation, repetition

3). Biophysiological stimulation (transmission below 300 and over 2,400 Hz)

The conversational frequencies are blocked. Only tactile stimulation (under 300 Hz) and neurophysiological stimulation (over 2,400 Hz) result from this transmission.

The student simply listens.

4). Biophysiological and linguistic stimulation (transmission below 300 and over 2,400 Hz and the specific optimal frequency)

Those frequencies are transmitted that differentiate most clearly the sound/word/sentence that is to be learned from

a). previously learned, perceptually similar segments/sequences of the target language,

b). the perceptually closest segment/sequence of the first language.

By blocking additional frequencies, association and interference may be avoided. (The student repeats.)

5). Linguistic stimulation (transmission of all previous frequencies with additional frequencies from the conversation range)

Conditioning and automatization of identification and reproduction. (The student repeats.)

6). Natural stimulation (transmission of the unfiltered original)

Adding of further frequencies till the transmission is unfiltered. (The student repeats.)

10. Collective correction procedure

Group conditioning is based on the concept of preventive correction, so only the last step of this procedure is actual correction. The skeleton process looks like this:

1). Presentation

Transmission is:

a). unfiltered

b). filtered by discontinuous frequencies (blocking conversational frequencies), thereby alienating the target sound(s)

c). through the low-pass channel in order to stress intonation patterns

(The student listens.)

2). Repetition

Transmission is:

a). filtered by discontinuous frequencies

(The student listens.)

b). filtered except for the low-pass channel

(The student repeats.)

c). filtered except for high-pass channel (in order to stress high frequency segments/sequences)

(The student listens.)

d). as in c). but

(The student repeats.)

3). Memorization and explanation (parts of sentences are transmitted through changing filters or sets of filters according to the phonetic inventory (cf. Chapter 7 above))

(The student repeats.)

4). Correction

The transmission is:

a). filtered by discontinuous frequencies

b). filtered except for the low-pass channel

c). combination of a). and b).

(The student repeats, starting with whole sentences and moving towards smaller linguistic units if necessary.)

11. Conclusion

Although frequency selectors have been in use in foreign language teaching in Belgium, France and Yugoslavia for a considerable amount of time, no relevant research or experimentation has been carried out either in other European countries or in the United States.

There are grounds to believe that the use of this apparative aid to phonetic correction can produce qualitatively better results and can speed up the process of acquiring a pronunciation which does not hinder communication in the foreign language.

This paper aims to be a short introduction to the stage of development of this technical aid in foreign language teaching and aims also to stimulate further investigation. It should be clear that the theoretical and didactic aspects of this method of phonetic correction have yet to be evaluated. Empirical investigations should not concentrate on collecting further disparate details, but should show some conclusive relevance for, and methodological relation to, the efforts in apparative phonetic correction in general,[26] so that these findings can be verified, and accepted or rejected.

REFERENCES

Notice: Papers mentioned here with full bibliographic detail are not listed in the bibliography!

1 The work on which this report is based was carried out at the University of Konstanz, Germany, as research project No. 126 in 1973 - 1974. Cf. Forschungsbericht der Universität Konstanz 1972/73, in: Konstanzer Blätter für Hochschulfragen 43 - 45, 1975, pp. 241f.

2 For an investigation into the psychological reality of phonetic description cf. Ertel, S., Psychophonetik, Göttingen 1969 and Greenberg, J. H. & Jenkins, J. J., Studies in the psychological correlates of the sound system of American English, in: Word 20, 1964, pp. 157 - 177.

3 For an evaluation of the practical use of this concept, cf. Hauri, H., Fehlerprognosen aufgrund kontrastiver Analyse - eine experimentelle Überprüfung, in: Bulletin CILA 21, 1975, pp. 41 - 50.

4 Intralingual discrimination as a problem in first language acquisition, cf. Beaken, M., The relation of speech-sound discrimination to developing speech, in: JIPA 2, 1972, pp. 48 - 58.

5 The comparison of standard dialects of different languages is actually not very useful, as they represent abstract systems. A contrastive analysis of e.g. Schwäbisch with Northern Central Midland dialect would yield more specific data and therefore have a higher predictive power for potential errors of e.g. Swabian students learning American English. Cf. James, A. R., Dialekt, Fremdsprache und phonischer Transfer. Eine kontrastive Analyse Schwäbisch - Englisch, in: LB 32, 1974, pp. 93 - 110.

6 A good survey of research into the acoustic correlates of perception is Plomp, R. & Smoorenburg, G. F. (eds.), Frequency detection in hearing, Leiden, 1970.

7 One should not forget that, for the time being, there is no phonological theory available that was developed for the practical aims of foreign language teaching. This means that foreign language teaching has to develop its own contrastive phonology on the basis of a differentiation in articulatory and perceptual phonetic representation. This should be possible by applying psycholinguistic and

sociolinguistic research methods. Cf. Kohler, K., On the Adequacy of Phonological Theories for Contrastive Linguistics, in: Papers in Contrastive Linguistics, 1971, pp. 83 - 88, and Kohler, K., Anwendungsorientierte Phonetik, Sinn und Unsinn der kontrastiven Phonologie für den Fremdsprachenunterricht, in: LB 26, 1973, pp. 70 - 78. For the necessity of potential convertability of perceptual, acoustic, and articulatory feature systems, cf. Thürmann, E., Phonetische Ähnlichkeit, distinktive Merkmale und auditive Dimension, in: Hamburger Phonetische Beiträge 13, 1974, pp. 163 - 192.

8 For information on the concept of phonetic similarity (without reference to the functional phonetic level), cf. Austin, W. M., Criteria for Phonetic Similarity, in: Language 33, 1957, pp. 538 - 543, and Hofstätter, P., Über Ähnlichkeit, in: Psyche 9, 1955, pp. 54 - 80, and Ladefoged, P., The measurement of phonetic similarity, in: SMIL 6, 1970, pp. 23 - 32.

9 A short introduction into the concept of perceptual tolerance in vowels is Cohen, A. & Slis, I. H., t'Hart, J., On tolerance and intolerance in vowel perception, in: Phonetica 16, 1967, pp. 65 - 70.

10 Cf. Schneider, A. & Wambach, M., 1967, pp. 3 ff.

11 Examples of (psychophonetic) research into the perceptual effects of acoustic distortion, cf. Blesser, B., Speech perception under conditions of spectral transformation, in: JSHR 15, 1972, pp. 5 - 42, and Castle, W. E., The Effect of Narrow Band Filtering on the Perception of Certain English Vowels, Den Haag, 1964, and Kile, J., Predicting Responses to Filtered Syllables, Ph. D. Diss. Ohio State University, 1968, and Klein, W. & Plomp, R., Pols, L. C. W., Vowel spectra, vowel spaces, and vowel identification, in: JASA 48, 1970, pp. 999 - 1009, and Lehiste, I. & Peterson, G. E., The identification of filtered vowels, in: Phonetica 4, 1959, pp. 161 - 177.

12 Cf. Cureau, I., 1972, p. 11.

13 A readable introduction into the verbo - tonal method of phonetic correction is Renard, R., 1971.

14 For an investigation into the perceptual structure of English sounds, cf. Singh, S. & Woods, D. R., Perceptual structure of 12 American English vowels, in: JASA 49, 1971, pp. 1861 - 1866, and Singh, S. & Woods, D. R., Becker, G. M., Perceptual structure of 22 prevocalic English consonants, in: JASA 52, 1972, pp. 1698 - 1713.

15 Cf. the tables in Schneider, A. & Wambach, M., 1967, pp. 15 ff, and in Vuletic, B., 1966, p. 68, and the description of the methods used,in Skaric, I., Les bases sensorielles de la parole, Part I, in: RPA 31, 1974, pp. 55 ff, see also Ref. 19.

16 Cf. Renard, R., 1971, p. 53.

17 E.g. Cureau, I., 1973, Renard, R., 1971, and 1973, Vuletic, B., 1973.

18 Cf. Guberina, P., 1973, p. 12.

19 Cf. Skaric, I., Les bases sensorielles de la parole, Part I, in: RPA 31, 1974, pp. 49 - 77, and Part II, in: RPA 32, 1974, pp. 49 - 64.

20 E.g. Dahout, 1963, Léon, P., 1963, Rivet, S., 1963, Lebel, J. G., 1969, and Trocmé, H. 1973.

21 Cf. Borowsky, V. & Kelz, H., (eds.), Phonetik im Fremdsprachenunterricht, Protokoll des 9. Workshops des AKS, in: IPK - Forschungsberichte 31, 1974, p. 69.

22 For more details on tension, cf. Skaric, I., 1974, pp. 71 ff, in paper cited in Ref. 19.

23 For a treatment of the feature [α released] , cf. Wang, W. S-Y., Transition and release as perceptual cues for final plosives, in: JSHR 2, 1959, pp. 66 - 73.

24 Cf. Renard, R., 1971, pp. 63 - 100.

25 Additional sample sentences are provided in Vuletic, B., 1966, p. 80.

26 A good introduction into apparative phonetic correction is Barry and Thürmann, (eds.), Apparative Verfahren der korrektiven Phonetik, to appear in Winter 1975.

ACKNOWLEDGMENTS

Iwould like to thank Fiona I. M. Ross of the University of Konstanz for helping me with my English. Perceptual phonetic correction has not yet taken over the field of graphemics, as she noticed. Likewise, I would like to thank Karen A. Kettemann-Kepchar for typing this manuscript and previous versions, without complaining too much.

BIBLIOGRAPHY

Arambasin, V.
Le Suvag-Lingua de classe,
in: RPA 27/28, 1973, pp. 17 - 23

Boulogne, J.
Manuel de pédagogie, rééducation de la perception des sons du langage au moyen d'auxiliaires techniques des SUVAG, I. et P., Paris, 1967

Crystal, D.
Non-Segmental Phonology in Language Acquisition: A Review of the Issues,
in: Lingua 32, No. 3, 1973, pp. 1 - 46

Cureau, J.
Correction phonétique - correction acoustique - le suvag-lingua,
in: Bulletin d'échange et de liaison, Enseignement audio-visuel des langues vivantes, IPN, No. 3, 1969, pp. 2 - 13

Cureau, J.
Acquisition acoustique de la langue. Les "Suvag Lingua",
in: Bulletin d'échange et de liaison, Enseignement audio-visuel des langues vivantes, IPN, No. 10, 1972, pp. 2 - 17

Cureau, J.
Le Suvag Lingua de classe,
in: RPA 27/28, 1973, pp. 35 - 42

Dabout,(Mme)
Utilisation des appareils SUVAG I en classe der Ire A,
in: Revue générale de l'enseignement des sourds-muets, No. 4, 1963

Danelon, L.
De la rééducation de l'audition par la méthode verbo-tonale à l'enseignement de la prononciation des langues étrangères,
in: RPA 7, 1968, pp. 3 - 30

Debrock, M. & Jouret, J.
Eléments d'une étude contrastive des systèmes phonétiques français et néerlandais,
in: RPA 19, 1971, pp. 3 - 33

Debrock, M. & Jouret, J.
Système verbo-tonal de correction phonétique des néerlandophones qui apprennent le français,
in: RPA 20, 1971, pp. 33 - 57

De Vriendt, S. & De Vriendt, M., Wambach, M.
Correction phonétique des francophones belges qui apprennent le néerlandais,
in: RPA 3, 1966, pp. 17 - 39

Dimitrijevic, N. & Djordjevic, D.
The Reliability of the Subjective Assessment of the Pupils' Pronunciation of English as a Foreign Language,
in: IRAL, Vol. IX/3, 1971, pp. 245 - 265

Forrez, G.
Quelques caractéristiques physiques du Suvag I,
in: Communications of the Laboratory for Experimental Otology and Logopedics, Katholieke Universitteit Leuven, Belgium, 1969, pp. 24 - 35

Fourgon, F.
Utilisation des appareils Suvag I,
in: Revue générale de l'enseignement des sourds-muets, No. 4, 1963

Guberina, P. & Gospodnetic, J., Pozojevic, M., Skaric, J., Vuletic, B.
Application du système verbo-tonal dans la correction de la prononciation, Mons/Besançon, 1963

Guberina, P. & Gospodnetic, J., Pozojevic, M., Skaric, J., Vuletic, B.
Correction de la prononciation des élèves qui apprennent le français,
in: RPA 1, 1965, pp. 81 - 94

Guberina, P.
Les appareils Suvag et Suvag Lingua,
in: RPA 27/28, 1973, pp. 7 - 15

Kettemann, B.
Korrektive Phonetik im Fremdsprachenunterricht,
in: Linguistische Berichte 28, 1973, pp. 65 - 70

Kettemann, B.
Einsatz und Möglichkeiten des Frequenzfiltergerätes SUVAG-Lingua innerhalb der korrektiven Phonetik im Fremdsprachenunterricht,
in: IRAL-Sonderband: Kongressbericht der 6. Jahrestagung der GAL, Heidelberg, 1975

Kobersky, E. & Schneider, A.
Experiance dans le domaine de la phonétique appliquée: L'emploi de l'appareil SUVAG-Lingua dans l'appentissage des langues,
in: Dix Années de linguistique théorique et appliquée, Mons, 1973

Lebel, J. G.
Apport des exercices systématiques de discrimination

auditive dans la correction phonétique,
in: RPA 10, 1969, pp. 3 - 8

Leon, P.
Perception of French Vowels by American-English Listeners, A Study of Intelligibility of Supposed Equivalent Sounds in French and in American-English, Etudes de Linguistique Appliquée, Didier, Paris, 1963, pp. 135 - 145

Leon, P. & Leon, M.
Introduction à la phonétique corrective, Hachette/Larousse, Paris, 1964

Miron, S.
Pronunciation and Phonemic Structure in Learning, in: Linguistics 115, 1973, pp. 67 - 92

Renard, R.
L'Appareil Suvaglingua, instrument de recherche et de correction phonétique,
in: RPA 4, 1967, pp. 59 - 67

Renard, R.
Sur le recours aux éléments prosodiques en phonétique corrective,
in: Mémoire et Publications de la Société des Sciences, des Arts et des Lettres du Hainaut, vol. 83, fascicule I, 1970, pp. 61 - 70

Renard, R.
Introduction à la méthode verbo-tonale de correction phonétique,
Didier, Paris, 1971

Renard, R.
Sur le recours à la tension en phonétique corrective,
in: RPA 17, 1971, pp. 71 - 87

Renard, R.
Système verbo-tonale de correction phonétique et Suvag Lingua,
in: RPA 27/28, 1973, pp. 3 - 5

Rivet, S.
Utilisation des appareils SUVAG I en classe enfantine,
in: Revue générale de l'enseignement des sourds-muets, No1.4, 1963

Roberge, C.
Mérites et démérites du binarisme face à la correction phonétique,
in: RPA 20, 1971, pp. 59 - 74

Roy, J.
Bibliographie verbo-tonale, Mons, 1973

Roy, J.
Essai bibliographique sur la méthodologie SUVAG et le système verbo-tonale,
in: RPA 27/28, 1973, pp. 69 - 85

Schneider, A. & Wambach, M.
Das System der Fehler und die phonetische Korrektion der Französisch-Sprechenden in der deutschen Sprache,
in RPA 5, 1967, pp. 1 - 40

Schneider, A.
Einige Bemerkungen zur phonetischen Korrektion,
in: RPA 7, 1968, pp. 79 - 83

Schneider, A.
Premier bilan d'une expérience de rééducation des mal-entendants par l'enseignement d'une langue étrangère,
in: RPA 10, 1969, pp. 11 - 29

Schneider, A.
Suvag-Lingua und die phonetische Korrektion,
in: Proceedings of the Sixth International Congress of Phonetic Sciences, Prague, 1967; Academia Publishing House of the Czechoslovak Academy of Sciences, 1970, pp. 799 - 801

Trocmé, H.
Le Suvag Lingua de classe dans l'enseignement d'une langue étrangère,
in: RPA 27/28, 1973, pp. 45 - 54

Tulasiewicz, W.
Some Experiments with the Verbotonal Method in Teaching the Deaf,
in: RPA 1, 1965, pp. 77 - 80

Vuletic, B.
La correction phonétique par le système verbo-tonal,
in: RPA 1, 1965, pp. 65 - 76

Vuletic, B.
Système des fautes et correction phonétique des français qui apprennent l'anglais,
in: RPA 2, 1966, pp. 49 - 86

Vuletic, B.
L'audition dirigée dans la correction de l'articulation,
in: RPA 27/28, 1973, pp. 25 - 33

Wambach, M.
Die phonematische und prosodische Spannung im Deutschen im Hinblick auf das System der Fehler und die phonetische Korrektion der Frankophonen in der deutschen Sprache,
in: RPA 11, 1969, pp. 31 - 56

Wuilmart-Riva, N.
Notes sur l'application du système verbo-tonal pour la correction phonétique de quelques voyelles chez des wallons apprenant le néerlandais,
in: RPA 1, 1965, pp. 77 - 80